INTERBUS-S Device Certification

1. Certification Background

Certification is the guarantee that your device is INTERBUS-S compatible. This process starts in the design stage of a product and continues until the device is finally submitted to the conformance testing body. This data sheet will explain the certification structure, requirements, benefits of certification and design considerations with certification in mind.

2. Benefits of Certification

Confidence that your device has been reviewed and deemed compatible with all other INTERBUS-S devices is one of the biggest benefits of certification. Other advantages are as follows:

- Schematic evaluation
- Possible design improvement suggestions
- Use of the INTERBUS-S Club's compatible logo
- Product will be published in the INTERBUS-S Club's Info-Service
- World wide exposure
- Acceptance for projects that mandate INTERBUS-S certified products

Figure 1. INTERBUS-S Certification Structure

3. Governing Body

The INTERBUS-S Club is the governing body of the certification process. They have the responsibility of controlling all the test methods, procedures, related specifications and documentation. Along with these duties, the club issues certification certificates and selects / audits test facilities. Figure 1 shows the relationship and responsibilities of the certification organization.

4. Certification Requirements

The first step in certifying a device is the scheduling of a test date. The device must be sent on this date along with the following items:

- Schematic drawings of the INTERBUS-S interface
- PCB layout and assembly drawings
- Parts list for the INTERBUS-S interface
- Device user manual / setup instructions
- Data sheets for components not listed in this document
- If the Peripheral Communications Protocol (PCP) is used, send the following files:
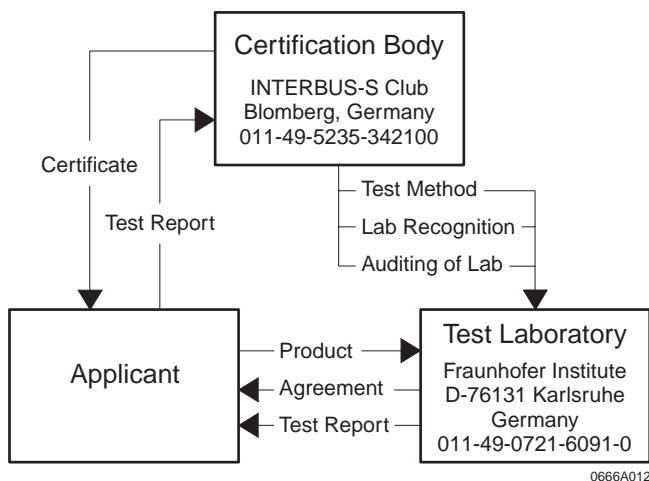
    A.) KBL.DAT, VFD.DAT and OV.DAT or the PICS file

After the testing is complete, a report will be sent from the test facility to the submitting party. If this report shows a positive result, the applicant must then send the report to the INTERBUS-S Club. The club is then responsible for issuing the official certificate allowing the applicant to use the "INTERBUS-S Compatible" certification logos on their device (shown in figure 2). This certificate is valid for 3 years. At the end of this period the applicant must resubmit the test report for renewal.
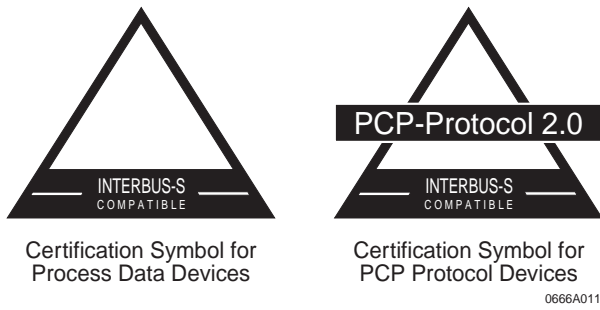
Certification Symbol for
Process Data Devices

Certification Symbol for
PCP Protocol Devices

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Figure 2. INTERBUS-S Certification Logos

5. Design Considerations

Certification of INTERBUS-S devices can be virtually assured by using proper design techniques for printed circuit boards, isolating of the protocol chip (SuPI) and the INTERBUS-S network signals and by using components listed on the approved components listing.

a. Circuit Board Layout

Circuit board layout should be considered when designing an INTERBUS-S bus interface. The use of proper power and grounding techniques for PCB and SMT type boards will greatly increase your chances to pass the external noise immunity test for certification. This external noise immunity test is carried out in accordance with IEC 801-4 and must meet the criteria of test class 3, minimum. Information on layout techniques is available through the INTERBUS-S Club.

b. Bus Isolation

Isolation is optional for certification but will improve the odds of passing the test. By isolating the incoming bus from the protocol chip (SuPI), bus fidelity will be greatly enhanced. Information for the design can be found in the SuPI manual (IBS SUPI II HB-E, 2758787, available from Phoenix Contact).

c. Component Selection

⚠ **CAUTION**

Product certification CANNOT be achieved with the use of nonstandard parts in the INTERBUS-S interface.

If the developer chooses to select unapproved parts there will be extra steps required to have these components added to the list in order to obtain certification. Non-standard parts need to be tested to ensure their functionality. This process is carried out by the INTERBUS-S Club in Germany. The first step for component testing is to arrange a test appointment and pay the testing fee. This fee will be paid for

each component that needs tested and there are no guaranties that your selected component will pass. To be on the safe side, develop with approved components listed in this document. See Tables 1 through 10. Surface mount components are marked with an asterisk.

Table 1. Remote Bus Drivers and Receivers

Part Number	Functional Description	Manufacturer
AD485	Differential RS 485 Transceiver	Analog Devices
AD485*	Differential RS 485 Transceiver	Analog Devices
DS26C31TN	Quad differential line driver	National Semiconductor
DS26C31TM*	Quad differential line driver	National Semiconductor
DS26C32ATN	Quad differential line receiver	National Semiconductor
DS26C32AIM*	Quad differential line receiver	National Semiconductor
DS96173N	Quad differential line receiver	National Semiconductor
SN75172N	Quad differential line driver	Texas Instruments
SN75173N	Quad differential line receiver	Texas Instruments
SN75176BP	Differential bus transceiver	Texas Instruments
SN75176BD*	Differential bus transceiver	Texas Instruments
SN75179BP	Differential driver and receiver	Texas Instruments
SN75179BD*	Differential driver and receiver	Texas Instruments

* = Surface mount component   0666A001

Table 2. Fiber Optic Transmitters and Receivers

Part Number	Functional Description	Manufacturer
TORX 104	Fiber optic receiver	Toshiba
QFBR-1607	Fiber optic transmitter	Hewlett Packard
HFX 6015-548	Fiber optic transmitter	Honeywell
HFX 6015-536	Fiber optic transmitter	Honeywell

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Table 3. Logic ICs

Part Number	Functional Description	Manufacturer
CD74ACT00E	Quad 2 input nand gate	Harris Semiconductor
HD74ACT00P	Quad 2 input nand gate	Hitachi
MC74ACT00N	Quad 2 input nand gate	Motorola
MM74ACT00PC	Quad 2 input nand gate	National Semiconductor
TC74ACT00P	Quad 2 input nand gate	Toshiba
CD74ACT74E	Dual D type flip flop	Harris Semiconductor
HD74ACT74P	Dual D type flip flop	Hitachi
MC74ACT74N	Dual D type flip flop	Motorola
MM74ACT74PC	Dual D type flip flop	National Semiconductor
TC74ACT74P	Dual D type flip flop	Toshiba
MC74HC14D	Hex schmitt-trigger invertor	Motorola
PC74HC14T*	Hex schmitt-trigger invertor	Phillips
SN74HC14N*	Hex schmitt-trigger invertor	Texas Instruments

* = Surface mount component   0666A006

Table 4. Power Supply Monitors/Supervisors

Part Number	Functional Description	Manufacturer
MAX700L	Adjustable power supply monitor with reset	Maxim
MAX709L	Power supply monitor with 4.65V reset threshold	Maxim

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Table 5. Opto Couplers

Part Number	Functional Description	Manufacturer
HCPL0601	Opto coupler	Hewlett Packard
HCPL0611	Opto coupler	Hewlett Packard
HCPL2601	Opto coupler	Hewlett Packard
HCPL2611	Opto coupler	Hewlett Packard
HCPL2630	Opto coupler	Hewlett Packard
HCPL2631	Opto coupler	Hewlett Packard
HCPL4661	Opto coupler	Hewlett Packard
Q62703-N77	Opto coupler	Siemens
HCPL2601	Opto coupler	Texas Instruments
TLP2601	Opto coupler	Toshiba

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Table 6. Voltage Regulator

Part Number	Functional Description	Manufacturer
TL7705ACD*	Supply voltage supervisor	SGS-Thomson
TL7705ACP	Supply voltage supervisor	Texas Instruments
TL7705ACD*	Supply voltage supervisor	Texas Instruments

* = Surface mount component

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Table 7. Expansion Output Registers

Part Number	Functional Description	Manufacturer
CD74HC164E	Parallel out serial shift register	Harris Semiconductor
MC74HC164D*	Parallel out serial shift register	Motorola
PC74HC164T*	Parallel out serial shift register	Phillips
SN74HC164N	Parallel out serial shift register	Texas Instruments
CD74HCT164E	Parallel out serial shift register	Harris Semiconductor
MM74HCT164N	Parallel out serial shift register	National Semiconductor
PC74HCT164P	Parallel out serial shift register	Phillips
MM74HC594P	Shift register w/output latches	National Semiconductor
MM74HC594D*	Shift register w/output latches	National Semiconductor
SN74HC594P	Shift register w/output latches	Texas Instruments
SN74HC594D*	Shift register w/output latches	Texas Instruments
MC74HC595N	Shift register w/output latches	Motorola
MC74HC595AN	Shift register w/output latches	Motorola
SN74HC595N	Shift register w/output latches	Texas Instruments
SN74HC595D*	Shift register w/output latches	Texas Instruments
SN74HC595TP*	Shift register w/output latches	Texas Instruments
MM74HCT595P	Shift register w/output latches	National Semiconductor
MM74HCT595D*	Shift register w/output latches	National Semiconductor
SN74HCT595P	Shift register w/output latches	Texas Instruments
SN74HCT595D*	Shift register w/output latches	Texas Instruments

* = Surface mount component

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Table 11. Phoenix Contact Supplied Component

Part	Functional Description	Order Number
IBS SµPI PLCC	Slave protocol IC	27 59 14 2
IBS SµPI II PLCC	Slave protocol IC	27 58 40 2
IBS SµPI II QFP*	Slave protocol IC	27 58 41 5
IBS SRE1 QFP*	Micro controlled expansion registers	27 52 85 1

* = Surface mount component

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Table 8. Expansion Input Registers

Part Number	Functional Description	Manufacturer
CD74HC165E	Parallel-load serial shift register	Harris Semiconductor
CD74HC165M*	Parallel-load serial shift register	Harris Semiconductor
MM74HC165M*	Parallel-load serial shift register	National Semiconductor
PC74HC165T*	Parallel-load serial shift register	Phillips
M74HC165M1*	Parallel-load serial shift register	SGS-Thomson
SN74HC165D*	Parallel-load serial shift register	Texas Instruments
CD74HCT165E	Parallel-load serial shift register	Harris Semiconductor
PC74HCT165P	Parallel-load serial shift register	Phillips
M74HC597B1N	Shift register w/input latches	SGS-Thomson
TC74HC597AP	Shift register w/input latches	Toshiba
CD74HCT597E	Shift register w/input latches	Harris Semiconductor
PC74HCT597P	Shift register w/input latches	Phillips

* = Surface mount component

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Table 9. Local Bus Buffers, Drivers and Selectors

Part Number	Functional Description	Manufacturer
74ACT240PC	Buffers and line drivers	Fairchild
CD74ACT240E	Buffers and line drivers	Harris Semiconductor
CD74ACT258E	2 to 1 line data selectors	Harris Semiconductor
HD74ACT258P	2 to 1 line data selectors	Hitachi
MC74ACT258N	2 to 1 line data selectors	Motorola
MM74ACT258PC	2 to 1 line data selectors	National Semiconductor
TC74ACT258P	2 to 1 line data selectors	Toshiba

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Table 10. Discrete Component Values

Part Number	Type	Manufacturer
MCO1400B-16MHz	Quartz Oscillator	TQE
VX-4231-16MHz	Quartz Oscillator	JVC
16MHz +/- 100pp mCL=16PF ESR=50Ω	Crystal	
220µF 6.3V 20% LLAG3VB-220(M)TPA(F2.5)	Capacitor	Nippon Chemicon
3.3µF 16V 20%	Capacitor	
15nF 650V 20%	Capacitor	
100nF 16V 20%	Capacitor	
22-68pF 16V 20%	Capacitor	
100W 0.25W 1%	Resistor	
15W 0.25W 1%	Resistor	
220W 0.25W 1%	Resistor	
390W 0.25W 1%	Resistor	
2.7KW 0.125W 10%	Resistor	
4.7KW 0.125W 10%	Resistor	
1MW 0.125W 10%	Resistor	

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